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EXAMINER	
DIRAMIO, JACQUELINE A	

ART UNIT	PAPER NUMBER
1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,617	BOGA ET AL.	
	Examiner	Art Unit	
	JACQUELINE DIRAMIO	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16,18-21 and 39-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16,18-21 and 39-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Applicant's amendment to claims 16 and 18 – 21 are acknowledged, as well as the cancellation of claims 1, 5 – 7, and 12 – 15, and the addition of new claims 39 – 48.

2. Currently, claims 16, 18 – 21 and 39 – 48 are pending and under examination.

Withdrawn Rejections

3. All previous rejections of the claims under 35 U.S.C. 112, second paragraph, are withdrawn in view of Applicant's amendments filed February 9, 2009.

4. The previous rejection of claims 1, 5 and 6 under 35 U.S.C. 102(b) as being anticipated by Caillouette (US 5,998,161) in light of Sigma-Aldrich Product Catalog is withdrawn in view of Applicant's cancellation of these claims.

5. All previous rejections of claims 1, 5 – 7, and 12 – 15 under 35 U.S.C. 103(a) are withdrawn in view of Applicant's cancellation of these claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 21, 43 and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the phrase "said control zone being located downstream from **said detection zone**." which is vague and indefinite because there are two detection zones and therefore, it is unclear where exactly the control zone is located on the porous membrane.

Claims 43 and 44 do not further limit claim 16 from which they depend because the analyte and the sample are not structural limitation of the device. In most cases, samples and any analytes therein are not collected or applied to the device until the time of use, therefore, they do not serve to further limit the device of claim 16.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 16, 18, 19, 39 – 42, and 45 – 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniels et al. (US 2006/0008921) in view of Miller et al. (US 7,014,816) and Caillouette (US 5,998,161) in light of Sigma-Aldrich Product Catalog.

Daniels et al. teach an immunochromatographic test strip (assay device) for detecting the presence or absence of an analyte within a test sample, said test strip comprising a porous membrane that is in fluid communication with a detection reagent (probes) conjugated with an immunoreactive specific binding member for the analyte, said porous membrane defining:

a capture region (second detection zone) within which a capture reagent is immobilized to bind to said detection reagent or complexes thereof to generate a detectable (detection) signal, wherein the amount of analyte in the test sample is proportional to the intensity of the detectable signal (see Figures 1 and 3; and paragraphs [0108]-[0120], [0133], [0201]-[0203], and [0232]-[0236]).

Daniels et al. teach the use of their test strip to detect various analytes, including bacteria, viruses and other microorganisms, such as those found in biological fluids, water or food stuffs (see paragraphs [0094], [0095], and [0232]-[0236]). However, Daniels et al. fail to teach the detection of amines, wherein the porous membrane includes a first detection zone that comprises an immobilized chemichromic dye in the form of a triarylmethane dye, said dye capable of undergoing a detectable color change upon reaction with one or more amines.

Miller et al. teach a device for detecting amines in a test sample, wherein the device comprises a substrate and a polymeric matrix that contains an indicator compound. The indicator compound can comprise various dyes that are capable of undergoing a detectable color change upon reaction with one or more amines. Amines represent volatile bases that are generated by food decomposition, therefore, the device provides an effective means to indicate the presence of an unwanted biological agent, such as bacteria or fungi, in a sample, particularly

a food sample, by colorimetric detection of amines (see Figures; and column 1, lines 20-61; column 3, lines 39-50; column 4, lines 4-49; column 5, lines 8-34; and column 6, lines 5-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the device for detecting analytes of Daniels et al. a detection zone that comprises a colorimetric reagent that undergoes a color change in the presence of amines as taught by Miller et al. because Miller et al. teach that a device that comprises an indicator dye that undergoes a color change in the presence of amines provides an effective means to indicate the presence of an unwanted biological agent, such as bacteria or fungi, in a sample, particularly a food sample, by colorimetric detection of amines.

However, Miller et al. fail to teach that the indicator dye specifically comprises triarylmethane.

Caillouette teaches an apparatus for detecting the presence or absence of amines in a test sample, said apparatus comprising a porous body that defines a color-changing area, wherein an indicator dye is contained within said color-changing area, said indicator dye including Bromocresol Green, Bromocresol Purple, or Bromophenol Blue, which are capable of undergoing a readily detectable color change upon reaction with one or more amines, said indicator dye having the general structure recited in Applicant's claims 1 and 16 (see Figure 1; and column 1, lines 5-57; and column 2, lines 30-62). It is noted that Bromocresol Green, Bromocresol Purple, and Bromophenol Blue are triarylmethanes as evidenced by Sigma Aldrich (see "Bromocresol Green, Bromocresol Purple, and Bromophenol Blue" located under "Stains and Dyes" within the Product Catalog of Sigma-Aldrich).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the indicator dye in the device of Daniels et al. as modified by Miller et al. with a triarylmethane as taught by Caillouette because Caillouttе teach the benefit of indicator dyes that comprise various chemical compositions, including Bromocresol Green, Bromocresol Purple, and Bromophenol Blue (i.e. triarylmethanes), because these types of indicator dyes are capable of undergoing a readily detectable color change under reaction within one or more amines.

With respect to Applicant's claims 18 and 19, the aryl groups of Bromocresol Green, Bromocresol Purple, and/or Bromophenol Blue, which comprise the indicator dyes used by Caillouette, comprise phenyl groups, which are either sulfonic-substituted, alkyl-substituted, or carbonyl-substituted (see "Bromocresol Green, Bromocresol Purple, and Bromophenol Blue" located under "Stains and Dyes" within the Product Catalog of Sigma-Aldrich).

With respect to Applicant's claims 39 and 40, Daniels et al. teach the inclusion of both a sample reservoir (conjugate pad) upstream of the detection zone, wherein said detection reagent is predisposed within said sample reservoir, and an absorbent or reservoir pad located downstream of said detection zone(s) (see Figure 3; paragraphs [0110]-[0112], and [0135]).

With respect to Applicant's claims 41 and 42, Miller et al. teach that the indicator dye is non-diffusively immobilized to the porous membrane, through either direct or indirect bonding (see column 5, lines 21-43; and column 6, lines 5-32).

With respect to Applicant's claims 45 and 46, Daniels et al. teach that the specific binding members and/or capture reagent can comprise antibodies (see Figure 1; and paragraphs [0090], [0091], [0098], [0136], and [0184]).

With respect to Applicant's claim 47, Daniels et al. teach that their detection reagents or semiconductor nanocrystals can comprise latex particles (see paragraphs [0167] and [0168]).

With respect to Applicant's claim 48, Daniels et al. teach that the detection reagents are labeled with a detectable substance (see paragraphs [0023], [0024], and [0080]).

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniels et al. (US 2006/0008921) in view of Miller et al. (US 7,014,816) and Caillouette (US 5,998,161), as applied above, and further in view of Horan (US 6,149,952).

The Daniels et al., Miller et al. and Caillouette references discussed in the 103(a) rejection above fail to teach that the indicator dye, or triarylmethane, comprises alpha-naphtholbenzein.

Horan teaches a method for determining the presence or absence of contaminating bacteria in a food sample, wherein the method comprises storing a food sample in a package that contains an indicator that is capable of undergoing a calorimetric reaction in the presence of carbonic acid, sulfuric acid, or ammonium hydroxide in order to visibly detect these compounds and thereby indicate the presence or absence (in the case where no reaction occurs) of contaminating bacteria. Exemplary indicators are taught, wherein indicators such as bromocresol green, bromocresol purple, and p-naphtholbenzein (i.e. alpha-naphtholbenzein) are listed as indicators that provide calorimetric responses to the addition of quantities of acid (see

Abstract; column 1, lines 49-60; column 2, lines 65-67; column 3, lines 1-12; column 7, lines 48-61; claims 1 and 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the indicator dyes used in the device of Daniels et al., Miller et al. and Caillouette with an alpha-naphtholbenzein as taught by Horan because Horan teaches that p-naphtholbenzein (i.e. alpha-naphtholbenzein) is an equivalent indicator dye to bromocresol green and/or bromocresol purple because of its ability of undergoing a readily detectable calorimetric response in the same environments as bromocresol green and/or bromocresol purple.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniels et al. (US 2006/0008921) in view of Miller et al. (US 7,014,816) and Caillouette (US 5,998,161), as applied above, and further in view Lawrence et al. (US 6,099,801).

Daniels et al. teach the inclusion of a control region downstream from said capture region, however, Daniels et al., as well as Miller et al. and Caillouette, fail to teach that the control zone contains a chemichromic dye.

Lawrence et al. teach a pH and amine test element that is useful in the diagnosis of vaginal infections. The test element contains a test section that is capable of detecting volatile amines in a test sample, wherein the amine test section contains an indicator that undergoes a detectable color change in the presence of a volatile amine. The amine test section also contains a second indicator that functions as a control and undergoes a detectable color change regardless of the presence of volatile amines in the test sample. The inclusion of a control that contains a color-changing indicator in both the pH and amine test sections of the test element is useful in

order to assure that the indicator is not malfunctioning for reasons such as manufacturing error in the device, and that the device has been exposed to sufficient sample to produce a reading if the sample is indeed positive (see Figures; Abstract; column 4, lines 5-25 and lines 64-67; column 5, lines 1-17; column 9, lines 54-57; column 10, lines 20-27; column 11, lines 22-54; and column 12, lines 7-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the device of Daniels et al., Miller et al. and Caillouette a control zone with a color-changing (chemichromic) dye as taught by Lawrence et al. because Lawrence et al. teach the benefit of including a control region with a second color-changing indicator, wherein a test area contains a first color-changing indictor, in order to assure that the indicator is not malfunctioning for reasons such as manufacturing error in the device, and that the device has been exposed to sufficient sample to produce a reading if the sample is indeed positive.

Response to Arguments

10. Applicant's arguments filed February 9, 2009 have been fully considered but they are not persuasive. In particular, Applicant argues (see pages 5-8) that it would not have been obvious to include the colorimetric agent taught by Miller et al. with the device of Daniels et al. because these systems are so vastly different given that the device of Daniels et al. is directed to a lateral flow device for detecting analytes concerning human conditions and diseases, while Miller et al. is concerned with detecting food spoilage.

This argument is not persuasive because the claims are drawn to a device for detecting multiple analytes, one of which is an amine and the other appears to be a biological analyte though it is not specifically defined in claim 16. As such, Daniels in view of Miller and Caillouette makes obvious the claimed invention. The argument that the method of Miller is only concerned with foodstuff and is different from the biological samples discussed by Daniels is not persuasive. First, it is noted that these are analogous art, i.e. they are both directed to immunological assays to detect biological analytes though in different types of samples. Second, any need or problem known in the field of endeavor at the time of the invention and addressed by the application can provide a reason for combining the elements in the manner claimed. And lastly, the claims do not specifically state the type of samples, thus this argument is not on point.

Daniels teaches a device appropriate for detecting multiple analytes (see paragraph [0008]). Daniels fails to teach the detection of amines using a triarylmethane dye. However, this is taught by Miller and Caillouette. Miller teaches assay and reagents for detecting amines in foodstuff and Caillouette teaches the use of triarylmethane dyes for detecting amines.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Daniels to detect more than one analyte including amines using appropriate reagents such as the triarylmethanes taught by Caillouette. A skilled artisan would have had a reasonable expectation of success in placing the reagents taught by Caillouette and Miller on the device of Daniels in order to detect amines in a sample because Daniels teaches that its device may be used to detect a variety of analytes using appropriate reagents. See paragraphs [0191] and [0193].

Secondly, Applicant's argument that a skilled artisan would not have been motivated to use a colorimetric reagent on the test strip of Daniels to detect amines is also not found persuasive.

Daniels teaches the detection of multiple analytes in a single sample or in multiple samples and teaches that appropriate reagents may be incorporated in the device dependent on the purpose of assay, and Miller teaches the detection of amines using a colorimetric reagents and Caillouette teaches the use of trimethylmethane dyes for detecting amines using a porous body. Therefore, a skilled artisan would have had a reasonable expectation of success in placing the triarylmethane dye taught by Caillouette in the device of Daniels to detect amines in a test sample since such a combination would be a combination of prior art elements according to known methods to yield a predictable result.

Thirdly, Applicant's argument that the position taken in the Office Action is tantamount to a finding that any possible detection agent for any conceivable purpose is "obvious" for use in a detection in the test strip of Daniels, and that such is not a proper analysis under 103 is also not found persuasive.

Clearly, Daniels teaches the detection of multiple analytes in a sample and teaches that the test strips of its invention may be configured so as to be capable of detection of multiple analytes. For example, a plurality of detection reagents, each specific for a single analyte of interest, may be employed. The detection complexes formed may then be detected and distinguished by a variety of means, etc. See paragraphs [0192] and [0193].

Therefore, the use of the triarymethane dyes taught by Caillouette in the device of Daniels constitute only a choice between a finite number of identified, predictable solutions, all with reasonable expectation of success.

Fourthly, Applicant's argument with respect to the flow of the sample in the Miller reference is not persuasive because it is not on point. The claims are directed to a device and each and every limitation of the claims is taught by Daniels, Miller and Caillouette. It is irrelevant how the flow of the sample is different since this is not recited in the claims.

Finally, Applicant's argument that the present inventors have discovered that the integration of amine and analyte detection zones with a single assay device can allow for the simultaneous detection of multiple infection indicators, such as amines and analyte such as C-reactive protein in vaginal fluid is also not persuasive.

First, it is noted that claims directed to the analytes being C-reactive protein and the test sample being vaginal fluid are newly added to this amendment and were not addressed in the previous office action. Second, claims 43 and 44 do not further limit the device of claim 16 because analytes and samples are not structural limitations of the device of claim 16. Claims 43 and 44 are mere intended use and are not given patentable weight. In other words, the sample and any analyte therein is not collected until the time of the assay and thus do not limit the device.

In conclusion, the rejection of the claims under 35 U.S.C. 103(a) as being unpatentable over Daniels et al. (US 2006/0008921) in view of Miller et al. (US 7,014,816) and Caillouette (US 5,998,161) is maintained.

Conclusion

11. No claims are allowed.

12. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Caillouette (US 2002/0058886) teaches a test apparatus for measuring pH and/or amines within a vaginal sample, wherein the amines are detected through the use of an indicator comprising bromocresol green, bromocresol purple, bromophenol blue, or nitrazine yellow (see Abstract; and paragraphs [0039], [0045] and [0046]).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACQUELINE DIRAMIO whose telephone number is (571)272-8785. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on 571-272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jacqueline DiRamio/
Examiner, Art Unit 1641

/Bao-Thuy L. Nguyen/
Primary Examiner, Art Unit 1641
May 11, 2009